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ABSTRACT

Alverno College (Wisconsin), a women's liberal arts college, has developed an Alumni Career Level Classification (AACLC) scheme to measure alumna career advancement and demonstrate institutional accountability. This validation study was part of a larger longitudinal study of two entire cohorts of students entering the college in 1976 and 1977, of whom most were predominantly first generation college students from working class backgrounds who worked before, during, and after college. Validation of the AACLC scheme focused on positions reported 5 years after graduation by 243 working female graduates. The study created three types of variables to validate the AACLC: (1) two criterion measures, a position autonomy scale and a cooperative organizational thinking and action ability factor; (2) four secondary validation variables (e.g., annual salary and current level of education); and (3) two variables validating the scheme's consistency, continuity in career area and causal modeling. Analysis found that the AACLC effectively measured career advancement and was anchored in meaningful definitions of career advancement for college graduates. The AACLC was found to be internally consistent in ranking position titles of alumna's colleagues in the organization. The AACLC demonstrated greater sensitivity to post-college career advancement than the socio-economic index in the fields of nursing, business and management, and education. (Contains 48 references.) (JB)

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MEASURING ALUMNA CAREER ADVANCEMENT: AN APPROACH BASED ON EDUCATIONAL EXPECTATIONS

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Abstract

This paper introduces the Alverno Alumna Career Level Classification (AACLC) scheme, which is used to measure alumnae career advancement and demonstrate institutional accountability. It shows greater sensitivity to post-college career advancement than the *SEI* in the fields of nursing, business and management, and education. It also enables description of the underlying autonomy afforded to the position. Its cross-field correlation with position autonomy, $r = .59$, and its effectiveness in modeling the determinants of career advancement provide validity evidence. Alternative regression models suggest working full-time continuously, completing a master's degree, and incumbent abilities may all contribute to career advancement. The conclusion addresses how other institutions might be able to extend and/or use career level classification as a tool for measuring and understanding alumni career advancement.

MEASURING ALUMNA CAREER ADVANCEMENT: AN APPROACH BASED ON EDUCATIONAL EXPECTATIONS

Academic institutions are under increasing pressure to demonstrate that graduates are prepared to meet the demands of increasingly complex and rapidly changing positions and careers. Higher education is viewed as "an essential part of the nation's continuing economic development, cultural vitality and general prosperity" (*Time for Results,* 1991). Public expectations of higher education graduates are high, yet there is a growing sense of public dissatisfaction with the quality and adequacy of higher education (*Time for Results,* 1991; *America 2000,* 1991). Do higher education institutions have the tools they need to meet the challenge of demonstrating their graduates' outcomes? Ewell (in press) provides an up-to-date summary of outcome indicators being used by states.

This paper focuses on one aspect of college outcomes—the career achievement of graduates.[1] Studying the career advancement of alumni should become a more integral part of institutional self-study because higher education institutions, among other functions, prepare students for more challenging and, often, as yet undefined careers. Traditional indicators, such as placement rates, will not be enough. Institutions that seek to demonstrate accountability for the purpose of their own continuous improvement may ultimately confront these questions:

- Do your graduates obtain positions they would not hold without the baccalaureate degree?
- To what extent do graduates continue to advance into positions that require more responsibilities, autonomy, and abilities?

Our approach to answering these questions emphasizes career placement in relation to the educational expectations arising from the completion of a baccalaureate degree, and subsequent career advancement in relation to increasing autonomy, responsibilities, and abilities in the position. In contrast to the approach articulated here, the literature on occupational achievement following college has been generally directed toward comparisons across occupational fields or toward comparison of levels of graduate school attendance and completion. Researchers have been developing generalizable models of the determinants of occupational achievement that national policy-makers can use (cf. Pascarella & Terenzini, 1991). Nonetheless, the most commonly used classifications of positions and careers have not been specifically designed to address post-college professional career advancements. To do this, more differentiation of post-baccalaureate positions needs to be made.

This paper describes and evaluates a measure of career classification that provides for a better understanding of post-baccalaureate career advancement. This measure, the Alverno Alumnae Career Level Classification (AACLC) scheme (Alverno College Office of Research and Evaluation, 1993) was developed by faculty and staff at Alverno College, a Midwestern liberal arts college for women. It was designed to classify position titles reported by Alverno students from the period that preceded entrance to college to five years after graduation.

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[1] This paper supersedes an earlier draft entitled, "Measuring and Understanding Alumnae Career Development: An Approach Based on Educational Expectations."

Career Achievement

Existing Occupational Classification Schemes

The *Dictionary of Occupational Titles* (DOT) provides a comprehensive description of positions in the U.S. (U.S. Department of Labor, 1991). The worker function ratings on data, people, and things have been used by some investigators as a measurement strategy for describing "substantive complexity" (Kohn & Schooler, 1978) or "job complexity" (Avolio & Waldman, 1990). These researchers have found mixed results in integrating these three worker function ratings into an overall index of the complexity of the position tasks. The preface to the DOT asserts that it "offers a starting place from which to address issues of training and education, career guidance and employment counseling, job definition and wage restructuring." The underlying construct that the DOT addresses seems appropriate to the task of scaling career achievement as a college outcome. Nonetheless, we have found the DOT less useful as a measurement strategy than as a starting point toward developing one (cf. Miller, Treiman, Cain, & Roos, 1980).[2]

So, what are the measurement alternatives? Most studies of career achievement measure socio-economic status using the Socio-Economic Index (SEI) (Duncan, 1961) or an adaptation of it (Hauser & Featherman, 1977; Miller, 1983; Stevens & Cho, 1985). The SEI is based on the census occupational classification and is assigned by weighing the *median* salary and level of education of the incumbents of each position title. The SEI was originally used by researchers who studied the occupational attainment model (Blau & Duncan, 1967; Sewell & Hauser, 1980) and investigated the impact of educational attainment on status attainment and intergenerational mobility (Jencks et al., 1979; Sewell & Hauser, 1975). The scale was originally based on male level of earnings and level of education (Duncan, 1961) and was later modified to reflect both changes in the census occupational classifications and the growing number and impact of women in the work force (Bose, 1973; Stevens & Featherman, 1981; Stevens & Cho, 1985).

Researchers have also used the SEI to measure the occupational status of college graduates. These researchers have typically asked: What is the impact of college learning and of a Bachelor's degree on graduates' occupational attainment? What are some between-college (in particular, selectivity and perceived prestige) effects on the socio-economic status of graduates? What are the effects of academic major area of study, academic achievement, and extracurricular activities? Do different populations benefit differently from college? Pascarella and Terenzini (1991) have summarized findings and insights from the last twenty years of research that attempt to answer these questions. They have concluded that "evidence suggests that completing a Bachelor's degree provides the single largest incremental return in terms of occupational status." They have also pointed out that postsecondary education enhances stability of employment and position

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[2] Kohn and Schooler (1978) addressed the conceptual issues that result from combining the worker functions, by developing separate estimations for workers who work with "things" from those who do not. In contrast, Avolio and Waldman (1990), based on their summary of the literature, elected to only use the "data" worker function as an index of complexity. Limiting job position complexity ratings to the data worker function avoids the differences between position ratings yielded by the three worker functions. Conceptually, however, the worker function that addresses the complexity of the responsibilities and judgments for working with people remains to be represented in this solution. The DOT itself only asserts that "as a general rule, Worker Functions involving more complex responsibility and judgment are assigned lower numbers..." (p. xix).

satisfaction. In terms of within-college effects, several studies (Solmon, 1981; Porter, 1989) show that earnings of graduates in professional areas tend to be higher than earnings of graduates in the humanities and social studies, but the extent to which this advantage extends over the entire career is still unclear (Pascarella & Terenzini, 1991).

Limitations of Socio-Economic Status Classification Schemes

The authors studied several versions of the SEI and found that measures based on the census occupational classification are not sensitive enough for studying the career development of college graduates. Specifically, we found the SEI inadequate for describing career development in the professions of education, nursing, and management that are typical for our alumnae. The SEI measures tend to offer only one index for each profession, for example: "teachers, elementary school," "registered nurses," and one very general index of management: "administrators, education and related field" and "managers, medicine and health." These categories do not clearly depict the substantial career advancement of a registered nurse who is promoted to nurse manager and then becomes a director of nursing. Nor does it adequately describe the career advancement of a teacher promoted to school vice principal and then to school principal. The range of management positions depicted in the scheme neither adequately represents career advancement on the corporate ladder nor approaches exhausting positions in the field.

Of greater concern, the underlying construct of the SEI does not focus on the responsibilities, abilities, or autonomy of position incumbents. The underlying construct for the SEI is the prestige of the occupation, and secondarily the position. As a result, it sets up status comparisons that become inappropriate in a college outcomes setting. This becomes most obvious in its use of salary as a scaling device. In the SEI, salary-based scaling distinctions tend to measure prestige comparisons *between* career fields, which themselves may be based on irrelevant features, such as the number of women in the field (cf. Wisconsin Task Force on Comparable Worth, 1986). Our concern is that the prestige of the field might become a larger determinant of the rating than advancement *within* the field. The other scaling device, the median level of formal education for position incumbents, also sets up these prestige comparisons inappropriately, even though its potential mis-specification of career achievement is less obvious. The scale variance in educational attainment is greatly reduced for college graduates and barely exists for those who do not pursue advanced degrees. Ironically, even though a college may study its baccalaureate graduates, the SEI ratings of career achievement in an entry-level, post-college position will reflect the median educational attainment of all positions in the field. As a result, fields where relatively fewer position incumbents in the population at large have baccalaureate degrees receive relatively lower SEI scores.[3] Also, since the SEI is relatively insensitive to upper level positions in many fields, it may underestimate the status of advanced positions achieved by graduates in these fields. At any rate, comparison of major-related fields based on socio-economic status seems to have more potential for divisive argument than for illumination of college career outcomes.

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[3] For example, according to the NCES figures on college graduate earnings (Porter, 1989), one-year alumni in business and management earn on the average $21,300, and one-year alumni in education earn on the average $14,500. However, on the SEI teachers are ranked much higher than managers. Since salary does not account for the higher ranking of teachers on the SEI, it is likely that the base rates for college degrees in the profession account for the difference.

Characteristics of A Desired Career Classification Scheme

Thus, we are advancing an alternative perspective on career achievement, and reconsidering the criteria for evaluating the career fulfillment of college graduates in the domain of paid employment. As one priority for a college outcomes study, we sought to represent career advancement and performance of graduates *within* their chosen career field in relation to faculty *expectations for* their graduates' *first positions* after college. As an equal priority, we sought an occupational classification scheme that represents career *advancement* on the basis of the abilities, autonomy, or responsibility expected of the position incumbent. As another goal, but not essential priority, we sought a scoring scheme that would represent career advancement comparably across fields. Such comparability across fields would enable a more broadly based study of career advancement. As such, our desired career achievement scheme is more compatible with the concept of "comparable worth" than with the concept of socio-economic status. Our purposes, however, do not involve any claim for determining graduates' equitable salary,[4] which would raise additional issues.

In summary, we needed an instrument that broadly measures career advancement in paid employment and meets the following specifications:

- It distinguishes typical career advancement from entrance to college to at least five-years post-college.
- It enables descriptions of career advancement that are accessible to a wide range of audiences.
- It reflects the level of responsibilities, autonomy, and abilities inherent to positions.
- It focuses on advancement on these dimensions within each career field, rather than on comparisons among various career areas.
- It is built on faculty expectations, based on their professional expertise in what constitutes college-level positions in their particular field.
- It is feasible for an individual institution to implement.

The primary validating criterion for the desired career classification scheme is demonstration of a relationship between career level assigned to a position and levels of ability, autonomy, and responsibility required of the incumbent. These are the desired underlying dimensions for characterizing career advancement (cf. Jaques, 1989).

Of course, we expect that promotion to a higher level of responsibility and autonomy within one's career track is accompanied by, among other things, an increase in salary. We might expect a positive correlation between acquiring a Master's degree and career level advancement as well, based on the assumption that a Master's degree can facilitate promotion to positions requiring a higher level of ability, autonomy, and responsibility. Earnings of holders of a Master's degree are generally higher than earnings of holders of a Bachelor's degree (National Center for Education Statistics [NCES], 1988).

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[4] Traditional female occupations tend to be characterized by lower pay than that of comparable positions held by males (Adelman, 1991; Featherman & Hauser, 1976; *Wisconsin Task Force on Comparable Worth*, 1986).

Method

Development of The Alverno Alumnae Career Level Classification

The Office of Research and Evaluation developed the AACLC scheme in collaboration with the Alverno College Career Development Office and faculty from various disciplines. The occupational classification specifies five career levels within each of nine major areas of study offered by the college (Alverno College Office of Research and Evaluation, 1993). Each position title was assigned a code that simultaneously reflects career area and career level. We classified all the position titles held by participants in the Alverno Longitudinal Study (Mentkowski et al., 1991) before entering college, while at school, and during the five years following graduation.

Assignment of Career Level

In collaboration with faculty of the respective major,[5] the first author assigned position titles in each major-related category to five career levels. Figure 1 details both conceptual attributes of each career level and some sample position titles. We assigned positions commensurate with expectations for the baccalaureate degree as having a *career level 3, professional position. Level 3* is the mid-point of the 5-point career scale. Attaining this position level would entail a graduate's entry into a professional college-level position. We also used available literature to determine what positions require a bachelor's degree or tend to be filled by college graduates (e.g., *Career Information Center,* 1990; Mitchell, 1990; U.S. Department of Labor, 1991). *Career level 1 and 2* of the scheme include position titles less likely to be filled by college graduates. Despite our criticism of the SEI, our distinction between these pre-college career positions was influenced by our review of the SEI occupational groupings (Stevens & Cho, 1985).[6] We assigned *career levels 4 and 5* to positions involving a higher level of autonomy, responsibility, and expertise than the college entry level. These positions require experience in the field, further demonstration of abilities, and sometimes further formal education.

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[5] We selected faculty for the task of defining position expectations based on their special expertise and familiarity with employment opportunity and career trajectories in their field. The authors are grateful to the following faculty who distinguished position titles within their field in relation to their expectations for graduates: Zita Allen (nursing), Vivian Deback (nursing), Jean Bartels (nursing), Mary Diez (education), and Regina Grantz (business and management).

[6] In particular, the categories of service positions, operators, fabricators, and laborers, were assigned *career level 1,* while sales and administrative support occupations were assigned either *career level 1 or 2,* and technical positions were assigned *career level 2 or 3.*

Career Level	Level Title	Attributes of Career Level
5	Highest in Field or Organization	Defined as management positions or professional positions at or next to the highest in the organization or in the typical career track within a field. Examples include president or vice president of a company, director of nursing, school principal, and dental surgeon.
4	Directors/ Advanced Professionals	Defined as either (a) directors of managers or of professionals, (b) advanced professionals with further education requirements, or (c) self employed professionals and owners of very small private businesses. Examples include director of public relations, assistant principal, or lawyer.
3	Professional College-Level	Defined as entry level for baccalaureates. In some fields, there are explicit scholastic requirements for obtaining professional certifications or otherwise being qualified for a professional position. Examples include nurse and teacher. Relevant management positions, however, are only loosely related to scholastic requirements.
2	Prefer Some College	Defined as not requiring a bachelor's degree, while generally preferring some college experience. It includes many technical, sales, and administrative support positions that work closely with professional positions. College should contribute to obtaining these positions and performing the abilities they require.
1	No Degree Required	Defined as not requiring or preferring a college degree. It includes all occupations keyed in the census classification to service positions and operators, fabricators, and laborers.

Figure 1. Attributes of the Five Career Levels

Career Fields Represented

Since the majority of the alumnae in our sample graduated with degrees in business and management or nursing, our career level classification contains a detailed list of position titles for these fields. The field of education has examples of position titles at all career levels. The remaining six career fields are much less developed.[7] We were able, however, to place many of the college's graduates from the liberal arts and social sciences in the business and management field of our career development scale, because many were employed in management, education, clerical, or sales positions. According to NCES data, approximately 50 percent of liberal arts and social studies graduates are employed in one of the above mentioned categories (Porter, 1989).

Longitudinal Study Design

This paper reports one part of the much larger Alverno Longitudinal Study[8] of two entire cohorts of students entering the college in 1976 or 1977. This report summarizes longitudinal career information about participants' employment, including position titles, and full-time versus part-time status. The longitudinal data bank contains information regarding the occupational history of the alumnae since their first position before entrance to college. The study of career advancement focuses on three key positions: a) the position that was held by the participant before entrance to college; b) her first position after graduation; and c) her current position five years after graduation. We assigned these three positions to AACLC categories. For the validation of the AACLC scheme, we focused on positions reported by alumnae five years after graduation because we could relate these positions to other career information, such as salary, level of education, alumnae abilities, and position autonomy.

Sample

The study focuses on one liberal arts college for women who are predominantly first generation college students from working class backgrounds who work before, during, and after college. As five-year alumnae, 254 women of Alverno College indicated post-college career information on a questionnaire. Even though the definition of the sample frame for eligibility in the five-year alumnae study included prior participation during the student years, 76% of the women from the two entrance cohorts, who graduated, participated as five-year alumnae. This report focuses on the 243 graduates who were employed five years after college. For certain validation analyses, the sample size was reduced. At entrance to college they ranged widely in age (18 to 55). They

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[7] These six major-related career fields are science and medical technology, music, art, social sciences/social work, professional communications, and religious studies. These fields help organize the current version of the scoring system.

[8] The study of career development is part of a longitudinal design (Mentkowski et al., 1991) that included 17 external measures administered to the entire entering classes of 1976 and 1977 (n=706): Measures of abilities, learning styles, motivation, cognitive, moral, and ego development, along with indepth, confidential interviews were administered on four occasions (76/77; 78/79; 80/81; 86/87); surveys of student perceptions, background, employment history, career goals, and career expectations, were employed on two occasions (80/81; 86/87). The Behavioral Event Interview (McClelland, 1978) was administered to alumnae (86/87). It serves as a criterion measure for alumnae performance across professions. Student participation rates across each cohort and each component of the study ranged from 84 to 99 percent; alumnae (n=358) rates range from 59 to 88 percent. The response rate for the alumnae questionnaire component of the study was 82% (n=295).

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completed their studies in either weekday or weekend program time frames across a range of academic majors and minors. The ability-based curriculum is infused throughout the student's general education and major experience (Alverno College Faculty, 1976, revised 1985, 1992). Two career fields predominated as majors,[9] nursing (50%) and management (30%). The Weekday programs attracted mostly traditional age students who graduated in nursing, education, and performing arts, as well as a range of liberal arts majors. The Weekend college offered full programs in management and communications and a special nursing program for practicing RN's who wished to obtain their baccalaureate degree. The majority of the students in the weekend programs were of non-traditional age. Thus, some variables for this sample cannot be analyzed as a factorial design because some interactions would not be represented. Most of the alumnae (95%) had paid employment when they participated in the study. Of them, 80% were employed full-time.

Validation Of the AACLC

We created several variables to validate and explain the usefulness of the AACLC. We distinguish between three kinds of validation variable. First and foremost are the criterion validating variables. All validating variables were scored independently of each other and of the scoring of the alumna's career level.

Criterion Validating Variables

The two main criterion measures capture the underlying dimensions of position autonomy and leadership ability.

Position Autonomy Scale. Five-year alumnae with their primary activity in paid employment described their position on the Position Autonomy Scale, (n=174), which is adapted from Elizur's (1980) Job Evaluation Scale. Areas of primary activity were defined in terms of time and energy. Most indicated paid employment was their primary activity (75%), and taking care of family was the other predominant primary activity (21%).

Participants ranked their current position along four facets of position autonomy, with five scale values each: a) discretion or authority granted, b) level of expression (oral or written) required, c) initiative and original thinking required, and d) level of judgment required. For descriptive and analytic purposes, we collapsed the scores of these four items into five broad levels of responsibility, which are summarized in Figure 2.[10] The context of the full interview (described immediately below) facilitated the identification of position autonomy level. Elizur (1980) concluded that the principle underlying the ranking of position levels seems to be the extent of autonomy or discretion in the task performance (cf. Jaques, 1989).

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[9] Proportions of students majoring in these and other fields, after college, have shifted substantially since the collection of this data.

[10] The sum of the four facets were averaged, and the following ascending cut-points were used to create five values: < 1.75, < 2.5, < 3.5, < 4.5. For Elizur (1980), six values were available for three of the facets. For these facets we collapsed values *1* and *2*, to create similar ranges of values on facets before creating the autonomy score.

Autonomy Level	Attributes of Autonomy Level
5	May determine policy in the area of own responsibility (creates messages on policy). Creates own direction of action according to general policy and makes final decisions in a general field of activity within the frame of great professional knowledge.
4	May determine guidelines for own area of responsibility (creates message content within guidelines). Creates new approaches and methods where no direct precedents are available.
3	Acting in the frame of general guidelines (creates message content on important matters as generally instructed), and revising existing procedures based on technical and professional knowledge of established principles or concepts. Responsible for various different activities and wide-ranging problems.
2	Acting according to general instructions, interpreting/changing message content or somewhat ambiguous instruction. (Some technical knowledge may be required.)
1	Acting according to detailed instructions. Passes along message content as generally instructed.

Figure 2. Levels of Autonomy from the Job Evaluation Scale Summarized Across Facets

Cooperative Organizational Thinking and Action Ability Factor. A core set of abilities in this ability Factor seems to capture the meaning of leadership for our five-year alumnae (Rogers in collaboration with Kleinman, Wagner, & Schwan Minik, 1994). It is the first of four ability Factors derived from Factor analysis of 471 performances in paid employment obtained from 157 five-year alumnae through the Behavioral Event Interview (BEI). The BEI was developed by David McClelland (1978) and colleagues at McBer and Company to measure multi-dimensional abilities as they are performed in the context of complex work situations, as a part of position competence assessment. It is related to Flanagan's (1954) Critical Incident Technique, eliciting critical performances that distinguish outstanding performers. Alverno researchers have refined the method for alumnae studies (Mentkowski & Rogers, 1993). A trained interviewer asked the participant to describe the context of each performance, and then guided the interview with a series of questions and probes (see Rogers & Reisetter, 1989). Research analysts judged alumnae events for abilities, carefully considering specific actions in the context of the performance and the outcome. For the purposes of these analyses, five-year alumnae were credited with the number of times they demonstrated an ability across the three performances in paid employment.[11]

[11] A total of six performances were generated through the interview (see Rogers & Mentkowski, 1993).

Secondary Validation Variables

Additional ability factors. The other three ability factors derived from the five-year alumnae performances on the Behavioral Event Interview are also validating variables. Almost all five-year alumnae held positions that grant autonomy to act within broad general guidelines. In such positions and higher, these particular ability Factors may be so much related to level of performance within the position that relationships of these ability Factors to the career level of the position may be swamped within position ability differences.[12] The secondary validating ability Factors are: Factor 2, Developing Self and Acting With Integrity; Factor 3, Developing Others and Perspective Taking; and Factor 4, Analytic Thinking and Action.[13]

Annual salary paid for current position. Five-year alumnae indicated on the questionnaire one of nine salary categories, arranged in $6,000 increments. We used the category mean as an estimate for the actual salary. For the purpose of validating the underlying dimensions of the scheme, we used only salary for alumnae who also had full-time paid employment as five-year alumnae (n=194). Full-time employees receive higher monetary compensation and may assume higher levels of responsibility than part-time employees in the same position. For sub-analyses of salary in relation to position autonomy, only those who indicated the same position title across the lapse in time between reporting salary on the alumnae questionnaire and completing the position autonomy scale (n=115) were compared.

Current level of education. For five-year alumnae, we operationalized further education as career significant if the alumna completed at least a Master's degree.

Title of first position after graduation anticipated by participants before graduation. We used faculty judgments as the primary source of defining expectations for first positions after college. However, student expectations for employment after graduation provides a comparative source of expectations for entry level positions.

Some of the participants in the study were asked in their fourth year at college what they thought their specific position-title after graduation would be (n=178). The first author coded their answers using the AACLC scheme. Based upon the premises of the scheme, we anticipated *career level 3* to be the modal level for expected first position after graduation.

Variables Validating Consistency of Scheme

The position title of the individual the alumna reported to and the position title of any individuals the alumna supervised were independently scored. Our assumption was that a supervisor's career level is equal to or higher than the individual reporting to him or her.

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[12] This distinction between primary and secondary validating variables has fuzzy boundaries, but articulating it is useful for evaluating the scheme.

[13] Rogers and his colleagues (1994) provide a description of these Factors and benchmark performance examples of key abilities that comprise them.

Continuity in career area. Our original intent was to investigate career advancement in relation to the extent to which graduates changed careers. Since few changed careers, the range of coding in career area is not a focus of this report. The determination of whether positions were related to academic major was accomplished through an iterative process that took into account the actual major of the alumna.[14] We examined whether an alumna had a position related to her major prior to graduation, and whether her position as a five-year alumna was related to her major.

Causal modeling. To investigate how well the scheme uncovers the expected determinants of career advancement and, thus, shows potential for increasing our understanding of career advancement, we conducted stepwise regression analyses of the set of predictor variables. The selection of variables for modeling career advancement post-college was influenced by their potential for advising students on career choices and for curriculum development. To investigate advancement, regressed change (career level not predicted by prior career level) was the primary construct of interest. Only statistically significant paths were retained in the model building.

For the regression modeling, we used several variables related to time in career. (1) Age at entrance: We did not have a systematic and precise measure of how long these women worked before entrance to the college. As a result, "age at entrance" represents much of the contribution of this variance to career achievement at entrance. (2) Working full-time continuously after college: Participants who had full-time paid employment throughout the five-year post graduation period were coded as working full-time continuously. Participants who did not have paid employment since graduation were not included in the career advancement analysis. (3) Time between graduation and five-year assessment: In general, time of assessment is held constant in the longitudinal design, but some variation in time of assessment exists in the "five-years" after college point of assessment. Also, the length of the interval since graduation is sometimes greatly affected by "delayed" or "early" graduation.

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[14] We confronted three major issues when classifying all the occupations held by our participants in relation to academic majors. First, as one might have expected, we could not classify many pre-college position titles in our data base as related to a specific set of majors. We created a distinct category "not related to academic major" for most of the occupations typically held by participants before entrance to college and while at college, such as clerical and waitress positions. Some pre-college occupations, however, are closely related to future professional areas and provide work experience that is valuable to a future employer. We coded these position titles as pre-entry level career levels. For example, we coded "nursing aide" or "doctor's office receptionist" as *career level 1* of nursing and "school paraprofessional" as *career level 2* of education. In the classification of management levels, we included sales and clerical positions that may potentially be precursors to higher level management or administrative positions. Those occupations that provide potential for mobility were keyed as *career level 1 or 2* management positions (e.g., secretary, sales clerk, and assistant manager).

A second issue associated with the assignment of a position title to a professional category related to an academic major is the potential overlap of professional categories. For example, "staff nurse" is closely related to nursing, while "HMO quality assurance analyst (nursing)" and "library head of technical services (education)" are more loosely related to a particular profession. These positions could have been keyed to the management/administration professional category as well. Likewise, a teaching position classified under education may be scored as related to any major as long as the alumna teaches her major's subject matter. We generally classified programming position as related to management, but in case of a math graduate employed as a programmer in an engineering company, we scored it as related to that major as well. For double-major alumnae, we coded a career relationship to either major.

A third issue is the strength of the relationship. The relationship between career field and academic major seems to be relatively clear in the professions. For example, a graduate of the nursing program is likely to obtain a staff nursing position immediately after college. This relationship is more complex in the humanities and social sciences.

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Some other variables were tested in some, but not all models. Because of potential differences between fields in determinants of advancement, we first built separate models of career advancement for the field of business and management (n=74) and for the field of nursing (n=109). Few of the alumnae in the field of business and management had preschool children, so this variable was not tested for inclusion in this field's career advancement model. Such a variable is, however, potentially important for understanding the relationship among different ways of integrating career and family and career development. For nursing, lack of full career data limited the number of five-year alumnae with completed master's degrees, and so this variable is not included in the test of the nursing career advancement model.

We tested a more general model of career advancement across fields. One version maximized the sample size (n=226). Another version maximized the model specification of relevant variables. In this latter alternative, we tested for whether the data were consistent with the possibility that alumnae abilities led to career advancement after college (n=123). Factors that had a zero order correlation with the career achievement of five-year alumnae were included in this modeling.

Results

Validation of the AACLC

Criterion Validating Variables

Position autonomy. First, it is helpful to look at the conjoint distribution of career level and autonomy across all fields (see Table 1). The correlation between position autonomy and career level is readily discernable in the conjoint distribution. The specific career level scored for the five-year alumna's position title tends to be somewhat lower than their corresponding modal autonomy score value. The modal career level is *level 3*, while the modal autonomy score is *4*. This is true for both nursing and business and management. There are some within field differences for autonomy of positions, however. For positions assigned the typical career level of *3*, five-year alumnae in the field of business and management have a higher autonomy score, M=3.8, than those in nursing, M=3.2, $t(67)$=2.44, $p<.05$.

Table 1: *Conjoint Frequency Distribution of Career and Autonomy Levels*

	Autonomy Level				
Career Level	1	2	3	4	5
5		1		2	13
4	1	1		22	17
3	2	19	30	30	10
2	2	5	9	5	
1	3	2			

Note. Sample for this analysis includes five-year alumnae working full-time with scores for each variable for the same position, N = 174. DC# A0032

For Alverno graduates whose primary activity as five-year alumnae was paid employment (n=165), fully 24% reported having responsibility for participating in policy setting. We might not have expected this high a percentage reporting such autonomy based on the position titles alone. To some extent, a high percentage figure may be accounted for by subjectivity in interpreting phrases such as "may determine policies in my own area of responsibility." But, position titles may also truly under-represent the responsibility of some aspects of the positions. Incumbents of positions that include some of the responsibilities of higher positions may have appropriately reported higher autonomy levels than otherwise similar positions. For example, four nurses who had some broader responsibilities than regular staff nurses, serving as either charge nurses or unit instructors, were scored higher on the position evaluation scale than most of the other nurses.

Also, some individuals may acquire more responsibility than is typically given to someone in that position. For example, one alumna, who had the title of "Supervisor-Employee Benefits," had responsibility for the budget delegated to her by the Director. Such delegation of responsibilities is not captured in the alumna's position title.

Table 2 displays the correlation of career level five years after college with autonomy in the position, for all fields and, in particular, the nursing and management fields. These correlations show that career level correlates well with autonomy within both nursing and management. Career level for five-year alumnae also correlates with the Cooperative Organizational Action and Thinking ability Factor for both the nursing and business and management fields (see Table 2). Thus, career level correlates with both criterion variables.

Table 2: *Correlation of Career Level Classification with Criterion and Validating Variables*

	Career Level		
Validating Variables	**All Fields**	**Nursing**	**Business and Management**
Criterion Variables			
Position Autonomy	.59***	.61***	.70***
Cooperative Organizational Thinking and Action (ability Factor One)	.31***	.38*	.34*
Secondary Validating Variables			
Developing Self and Acting With Integrity (ability Factor Two)	.04	-.05	.13
Developing Others and Perspective Taking (ability Factor Three)	.26**	.22	.32*
Analytic Thinking and Action (ability Factor Four)	.11	.01	.19
Salary	.35***	.42***	.38***
Master's Degree	.31***	.36***	.25*

Note: For all fields n ranges from 144 to 194. For Nursing n ranges from 59 to 88. For Business and Management n ranges from 71 to 79.

*p<.05. ** p<.01. ***p<.001

Secondary Validating Variables

Ability Factors 2, 3, & 4. Table 2 also shows that career level correlated overall with the Developing Others and Perspective Taking Factor, although it did not reach statistical significance for the field of nursing. Neither the Developing Self and Acting With Integrity ability Factor nor the Analytic Thinking and Action ability Factor approached statistical significance (see Table 2).

Salary and educational attainment. As expected, we found a moderate correlation between career level and salary level, as well as between career level and obtaining a Master's degree (see Table 2). When correlations were computed within profession, career level correlated nominally higher with salary, average r=.41.

Student expectations. When seniors were asked to indicate the position title they expected after graduation, 20% did not complete an answer. Of those who answered the question, 82% anticipated having a position classified as *professional college-level* after graduation, 14% anticipated a *career level 1 or 2* position title, and 4% expected a position at *career level 4 or 5*. This distribution is very similar to the actual distribution for the first position after graduation.

Consistency of the AACLC. The career level score assigned to the alumna's position was never out of the expected rank order when compared to the independently assigned career level scores for the individual she reported to and to those who reported to her.

Career Level Versus Salary as Career Achievement Indices

In order to empirically compare salary and career level as potential indices of career achievement, we compared how well each of these indices correlated with the criterion variables and with educational attainment. Salary was available for comparable positions for only a sub-sample. To make the comparison of indices, we recomputed the relevant correlations with a comparably reduced sample size, recognizing that this reduces stability of the estimates considerably. For the field of business and management, career level appeared to correlate better with position autonomy, $r(55)=.75$, $p<.001$, than did salary, $r(56)=.37$, $p<.01$. For the field of nursing, the two indices correlated more similarly with position autonomy, between .55 and .58, $p<.001$, respectively. The two indices correlated somewhat similarly with the Cooperative Organizational Thinking and Action ability Factor. For the field of business and management, both the career level index, $r(50)=.35$, $p<.05$, and salary index, $r(50)=.45$, $p<.01$, correlated with Cooperative Organizational Thinking and Action, whereas neither index reached statistical significance for the smaller sample of nurses available for the comparison (n=34).

Application of the AACLC Scheme to the Study of Career Advancement

A major goal for the Alverno Alumnae Career Level Classification has been to inform faculty and staff about their students' careers after graduation. The AACLC codes can be used to describe both general trends in the alumnae population and individual career trajectories in paid employment. In the following sections we will describe the major findings regarding alumnae career advancement and some relationships between career advancement and some of its possible determinants of career advancement.

Description of Aggregate Career Advancement

Table 3 demonstrates how the AACLC facilitates portrayal of career achievements in paid employment before and after college. Before entering college, 24% of the participants held positions classified as *professional college-level* or above (i.e., *levels 3, 4,* or *5*). In their first positions after graduation, 82% of them held positions classified as *professional college-level* or above. Thus, the biggest career advancement occurred, as expected, from entrance to graduation. When considered at the level of the individual alumna, 71% of the alumnae improved their career level compared to the career level of their pre-college position. Considerable career advancement occurred after graduation as well. In Table 3, this is reflected in the larger percentage of five-year alumnae who have achieved career levels *4* and *5*. At the level of the individual, 22% of five-year alumnae improved their occupational position compared to their first position following graduation. It should be noted that there are some differences between fields in the percentages of alumnae who do not achieve positions classified as at least *professional college-level.* Virtually all degreed nurses achieve staff nursing positions, whereas graduates majoring in business and management have some likelihood of occupying position classified at career level *1* (6%) or career level *2* (20%).

Table 3: *Longitudinal Career Level Achievement Percentages From Before College Entrance to Five-Years After College*

	Time		
Career Level of Positions Achieved	Before Entrance	First After Graduation	Five-Years Alumnae
5. Highest in field or organization	1%	2%	6%
4. Directors/advanced professionals	3%	11%	18%
3. Professional college-level	20%	69%	63%
2. Prefer some college	17%	13%	10%
1. No degree required	59%	5%	3%
Total	100%	100%	100%

Note. Includes only those who held paid employment positions at each of the three times of assessment, $n = 215$. DC# A0041

Using the relationship between career level and position autonomy, we can estimate the position autonomy for the larger sample of participants who report their job title.[15] We can describe each career level in terms of the amount of position autonomy it typically affords. Thus, the AACLC career level scheme supports accountability descriptions both in aggregate statistics and in analysis of individual trajectories of career advancement. For most Alverno graduates, college education contributed to their career advancement to professional *college-level* positions. These professional college-level positions typically involve responsibility for various activities and wide ranging problems or even the autonomy to determine guidelines in their area of responsibility. By five years after college, almost a quarter had advanced into positions of *director/advanced professionals* or *highest in the field or organization*. At the very least, all of these positions

[15] In the present study, more participants were asked to report job title than were interviewed on their level of autonomy in their paid employment position.

require them to determine the guidelines for their own areas of responsibility, and often involve responsibilities for participating in policy setting. For most alumnae, the major career advancement occurred immediately after graduation but for some it occurred later in their career.

Description of Individual Career Trajectories

One advantage of the AACLC is that it supports depiction of individual career trajectories. In this section we present six prototypical trajectories as a demonstration.

Advancement to college-level career (53%): Before college, these women held career level *1* or *2* positions—or else were not employed—and then they advanced to a *professional college-level* position. Almost all of these alumnae advanced to these positions immediately after graduation. Among traditional aged nursing majors without prior certification, advancement meant obtaining the expected staff nurse position for nearly half of this trajectory grouping. A few in this trajectory grouping (12%), typically in business and management, took longer to advance to these positions.

Continuous and high-achieving advancement (11%): Before college these women also held career level *1* or *2* positions and then reached career level *4* or *5* positions five years after graduation. Most of them moved to a college-level position immediately following graduation and to a higher level thereafter. However, several women made a big leap by the time of their first position after college.

Pre-established and maintained career (11%): These women entered the college with a *professional college-level* position or above, and then maintained the same level through their professional career. Having an established career before college is generally positively correlated with age, as noted below.

Pre-established career further advanced (9%): These women also entered college with a *professional college-level* position and then, after graduation, advanced beyond this level. Most were over 30 years of age at entrance. Forty-three percent of alumnae in this trajectory grouping either obtained a Master's degree or were enrolled in graduate school five-years after graduation.

Did not reach college entry-level position (10%): These women held career level *1* or *2* positions before Alverno, in the first position after Alverno, and again five years after Alverno, and management.[16] Half of the alumnae in this trajectory grouping advanced from *career level 1* to *career level 2*.

Career attainment with career retrenchment (6%): These women obtained at least a *professional college-level* position at one point in their career, and then showed some career retrenchment. Retrenchment most often was evidenced in their five-year alumnae positions.

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[16] Too few alumnae graduated from the liberal arts to warrant conclusions.

Determinants of Career Advancement

The validity of the career level classification as a measure of career advancement can be investigated in relation to how well it describes the determinants of career advancement for this sample.

Business and management. Figure 3 displays the final linear model for the field of business and management, R^2=.38. While age at entrance (and thus prior job experience) has a strong positive relationship to initial career level, its effect on later career levels appears to be indirect for business and management. Career advancement in business and management is related to working full-time continuously after graduation. Even by only five years after college, the completion of a master's degree is related to career advancement (see Figure 3).

Major-related work experience prior to graduation is not statistically related to career level five years after graduation, but the variable's distribution is somewhat restricted.[17]

Nursing. For the nursing model, R^2=.39, all three variables related to time invested in career appear to potentially contribute to the career advancement of five-year alumnae (see Figure 4). In contrast to the model for business and management, the model for nursing suggests that age at entrance (thus, length of prior job experience) continues to have a direct lagged effect, as well as indirect effect, on career advancement. Age at entrance predicts career advancement all the way to five years after graduation. To some extent this may be accounted for by the slightly greater variance in age for this nursing population (*sd*=9.4) compared to those in the field of business and management (*sd*=8.4). In addition, career advancement for nurses appears to be positively related to two aspects of the post-graduation interval, the length of the interval and working full-time continuously. Neither having major-related experience nor having preschool children entered the model for nursing career advancement.

Within the field of nursing, having preschool children is negatively correlated with career level of the position held by five-year alumnae, $r(120)=.-21$, $p<.05$. However, when we force the preschool children variable into the nursing model for career advancement, it still does not approach statistical significance, $b(101)=-.09$, $p>.36$, and neither does working full-time continuously after college, $b(101)=.12$, $p>.17$.

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[17] Fourteen students in the field of business and management did not work in a position related to their major. Even students who enter the college without an established career are likely to have been employed in major-related positions before and/or during college (68% of all of those in this study). All students who established their career at a professional college-level or beyond before entering college had prior employment experience related to their major. This paid employment is not required by the curriculum and would be in addition to the curriculum requirements for participation in off-campus learning experiences (See Hutchings & Wutzdorff, 1988). Thus, the consistency of a base exposure to the world of work severely restricts the ability to generalize beyond this college.

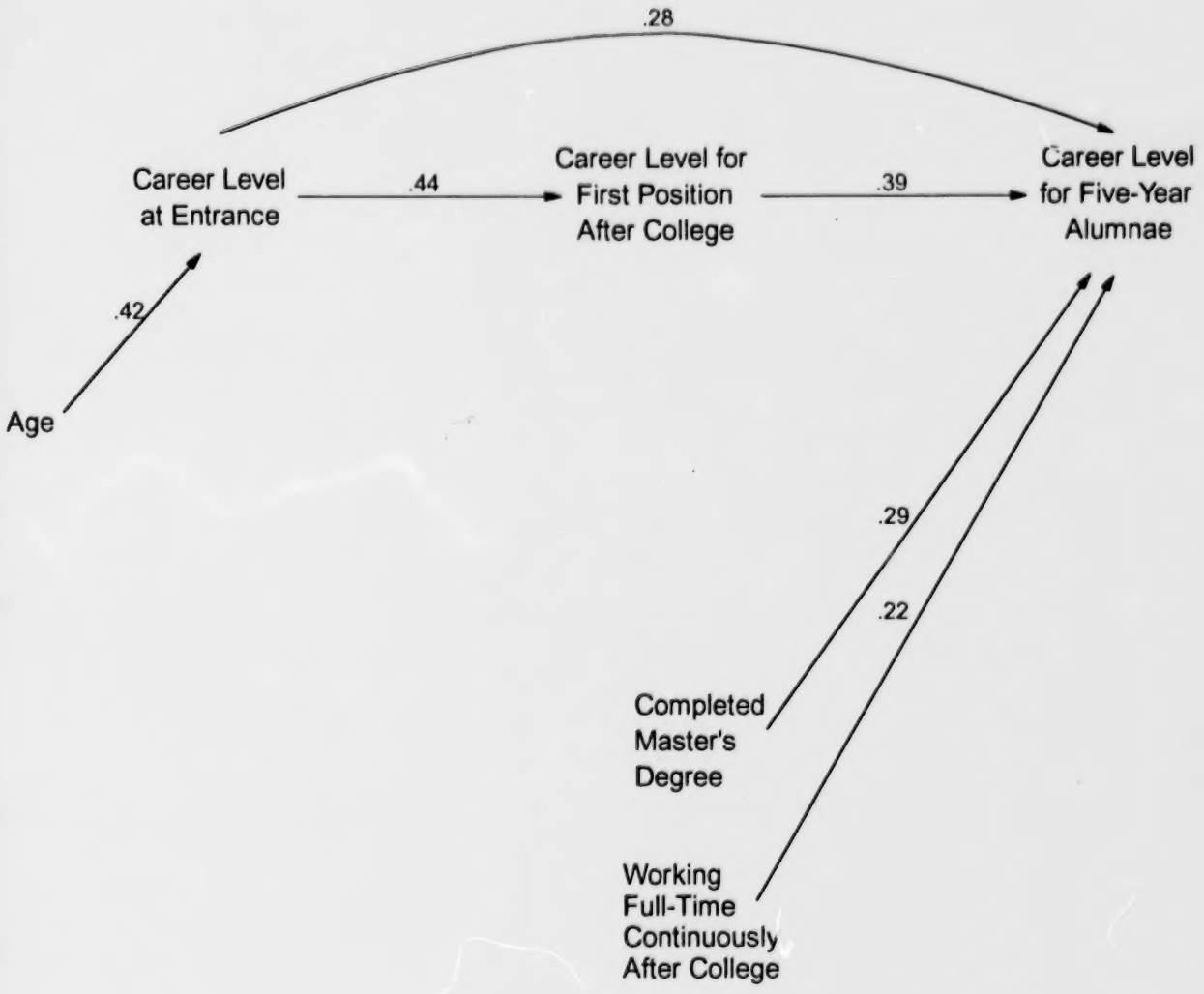

Figure 3. For Business and Management, Standardized Beta Coefficient Regression Model of Career Advancement to Five-Year Alumnae Position

DC#A0046

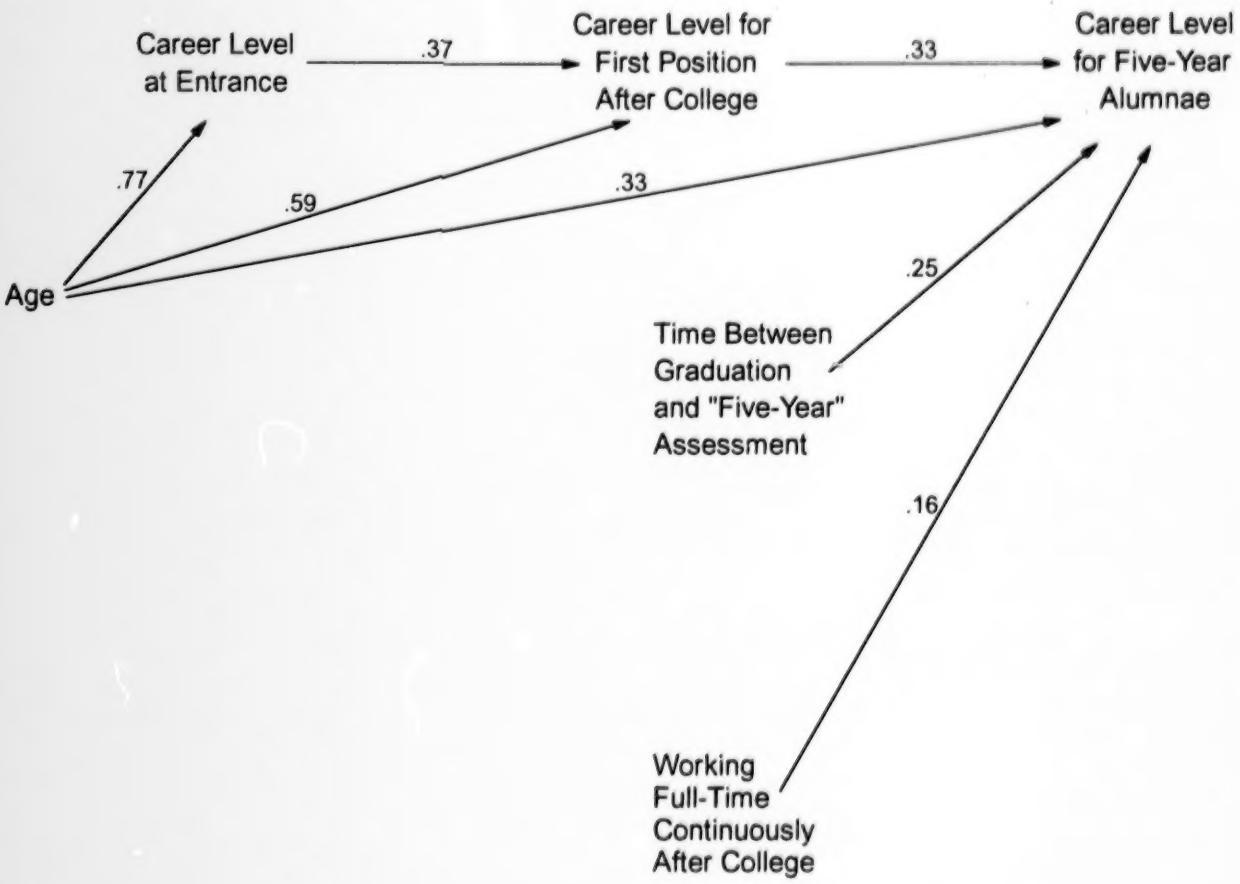

Figure 4. For Nursing, Standardized Beta Coefficient Regression Model of Career Advancement to Five-Year Alumnae Position

DC# A0040B

Across field models. The across field model that maximized the sample size n=226, R^2= .37, retains all of the paths that were statistically significant in either within field model. Across fields, having preschool children is not related to career level, salary level, or completion of Master's degree, even though Alverno graduates with preschool children were less likely to work full-time continuously in paid employment after graduation, $r(235)$=-.36, $p < .001$.

The across field model that maximized the model specification of additional variables, n= 123, R^2=.41, yielded a statistically significant path for the Cooperative Organizational Thinking and Action ability Factor (see Figure 5). In comparison to the model maximizing sample size across fields, this ability Factor relates to career advancement for five-year alumnae, at the expense of two other variables, working full-time continuously and time since graduation.

Discussion

The Alverno Alumnae Career Level Classification (AACLC) scheme effectively measured career advancement within the professional areas addressed. Moreover, as a measure of the career attainment of college graduates, the AACLC scheme has demonstrated the crucial advantage of being anchored in meaningful definitions of career advancement for college graduates.

The AACLC scheme enabled us to describe career achievement of five-year alumnae in paid employment in terms of the autonomy and position level typically associated with the position title. We have been able to translate the position's career level score into an expected range of position autonomy for the incumbent, based on the common numeric range of values and overlapping meanings for the two scales. This supports making estimations of position autonomy from position titles alone and has implications for the research potential of the AACLC. At the same time, classification of position titles is only a rough estimate of the level of autonomy required of an incumbent of a certain position. Even the same position title may imply significantly different levels of autonomy (as well as abilities) in institutions of various type, size, or industrial affiliation. We also have not fully settled the question of the cross-field comparability of the scoring. Staff nursing positions seem to involve somewhat less autonomy than positions in business and management that are also scored at the *professional college-level*. This is difficult to interpret, however. Compared to nursing, fewer alumnae in the field of business and management achieved a position scored at a *professional college-level* or higher.

Because the AACLC scheme helps make expectations for career attainment more explicit, and because it helps characterize the nature and frequency of career advancement beyond college graduate entry level positions, the aggregate results reported here can engage discussions with wider audiences and stakeholders. For example, a summary of these career results have been reported in the *Alverno College 1992-93 Annual Report* (Alverno College, 1993). Thus, we have been able to meaningfully report and widely disseminate an AACLC-based description of career achievement and have, so far, avoided divisive discussions around the interpretation of the index. In contrast, many individuals react negatively to salary as index of career achievement. Perhaps because salary is such a transparent metric, it seems to invite unfair comparisons of individuals across fields.

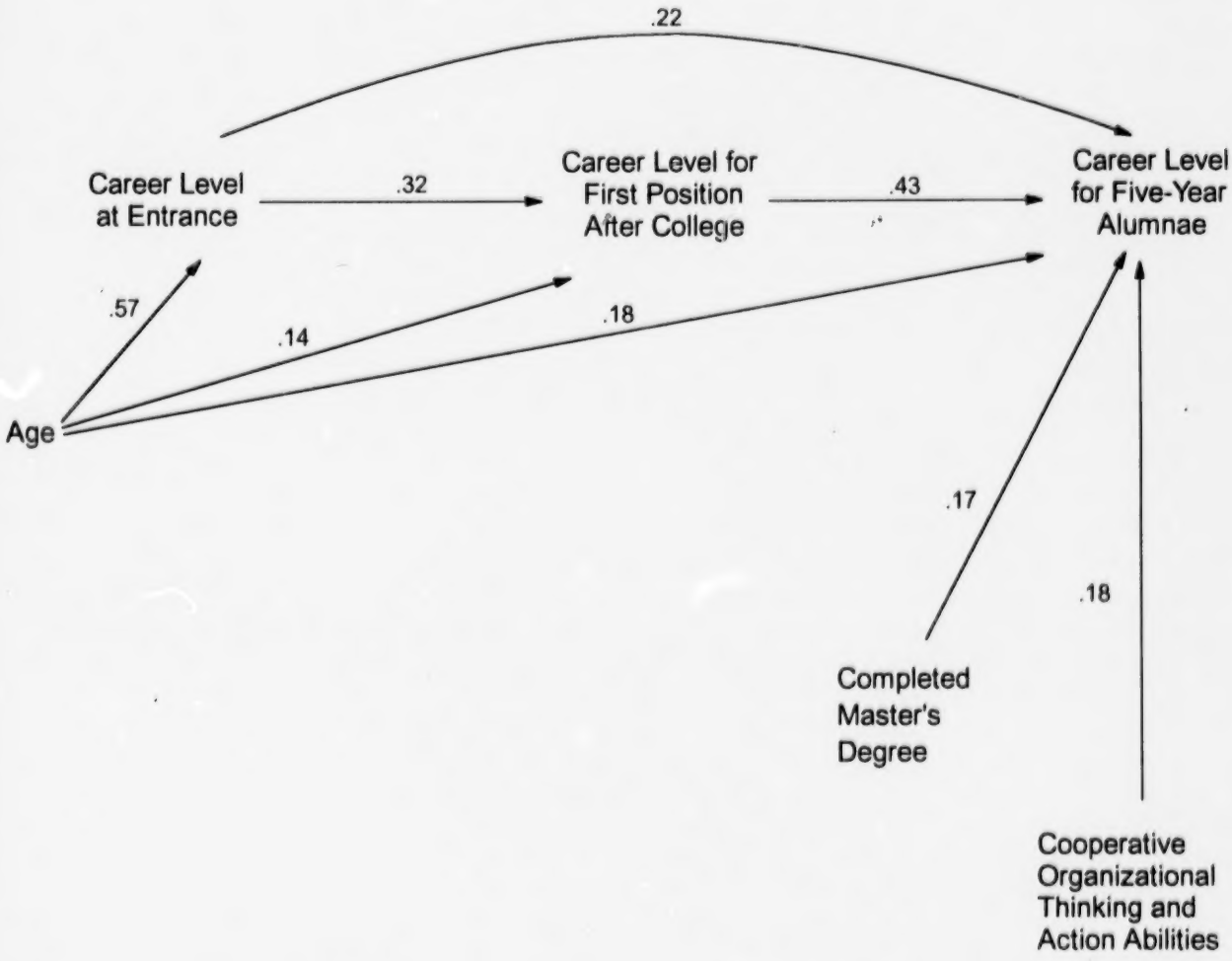

Figure 5. For All Fields, Standardized Beta Coefficient Regression Model of Career Advancement to Five-Year Alumnae Position

DC# A0050A

As we expected, the AACLC scheme appears to capture, more adequately than earnings, the range of autonomy and abilities of the college graduates' positions. At the same time, the AACLC scheme complements the traditional use of indices based on salary advancement, which is, after, all one rationale for attending college. Of course, the modest correlation of salary with career level may be the result of marketplace or structural differences between career fields that act to weaken the relationship between position autonomy/responsibility and salary. This would be consistent with the seemingly stronger correlation between career level and position autonomy than between salary and position autonomy.

Although the scheme does not reflect small career advancements, such as promotion from Nurse I to Nurse II, it is more sensitive than the SEI to different levels of advancement within career fields. As a result, we have been able to demonstrate that Alverno graduates do typically achieve positions commensurate with their college education, *and*, more to the point, that many show even further advancement in their careers. Of course, they are more likely to achieve these positions when they have had time to develop their potential for career advancement. Indeed, our findings confirm that the amount of time invested in work is a major determinant of career advancement (cf. Mincer, 1974; NCES, 1988).

The metaphor of climbing the career ladder is certainly appropriate for describing these results. For both the fields of nursing and business and management, working full-time continuously after graduation was related to career advancement. In addition, age had a substantial positive lagged effect on career achievement in nursing, above and beyond the effect of prior career level achieved. From the lagged "age" we infer that the overall length of a nursing career, as measured by age at entrance to the college, was systematically related to the potential for career advancement into advanced positions (cf. Mincer, 1974). Consistent with other research suggesting that educational attainment is related to career achievement (see NCES, 1988), five-year alumnae in business and management who went on to obtain a Master's degree showed greater career advancement. Parenthetically, the strong "age" effect in predicting the career level of nursing majors at entrance to college reflects the contribution of their two year nursing degree to acquiring the prior nursing experience that ultimately leads to even further career advancement.

Although we have been able to demonstrate that the AACLC relates to the determinants of career advancement as expected, we do not claim to have untangled the competing interpretations of the negative effect of child rearing on the career advancement of women. Neither working full-time continuously nor having preschool children significantly accounted for variance in the nursing model when the other variable was controlled. Still, in the business and management model, where almost no alumnae had preschool children, working full-time continuously did seem to have an independent effect on career advancement. This finding is consistent with other research that suggests women working part-time report greater exclusion from the organization, even when number and ages of children are taken into account (Barker, 1993).

Our causal modeling across the combined career fields was consistent with the hypothesis that abilities may lead to career advancement. We note, however, that alumnae abilities were generally measured through performances that occurred in the context of the position being predicted. This position might enable alumnae to express or develop more abilities, as well as require more abilities. Although the present analyses do not rule out the possibility that the causal direction

may be reversed (i.e., that career achievement may lead to the demonstration of abilities), the analyses do support the importance of abilities to performance in higher level positions, and are at least consistent with the expectation that abilities can contribute to career advancement. Other research suggests more unambiguously that related broad leadership abilities, such as organization and planning, are predictive of future career advancement for men (Bray & Howard, 1983).

Thus, the nature of the observed relationship between career level and abilities of position incumbents is suggestive of what abilities are needed as women advance in their careers. As a leadership ability Factor, Cooperative Organizational Thinking and Action, has the clearest conceptual relationship to career level of any of the four Factors. Most of the abilities within this Factor (see Rogers et. al., 1994) have been independently associated with outstanding performance for these five-year alumnae (see Rogers & Mentkowski, 1993). Other researchers have also identified similar abilities as distinguishing outstanding performers, especially in middle or upper level management positions (see Boyatzis, 1982, pp. 225-228; Klemp & McClelland, 1986; Spencer & Spencer, 1993).

The correlation of the Developing Others and Perspective Taking Factor with career level provides evidence that these abilities are also important to organizations (cf. Spencer & Spencer, 1993). Such abilities may become even more important to managers as organizations become flatter and responsibilities are more widely dispersed throughout positions (Klemp, 1994, personal communication). Although this ability Factor did not enter the causal model for the determinants of career advancement, its nominal relationship to the career level of five-year alumnae should offer encouragement to faculty who seek to further these liberal arts abilities for their own sake (cf. Mentkowski & Rogers, 1993).

The relatively small size of the relationship between career level and the abilities demonstrated by the incumbent might be the result of a number of different mechanisms. Although we would expect many alumnae with high abilities to eventually advance to higher career levels, it may take, in addition to abilities, a significant amount of experience. Moreover, some alumnae with sophisticated abilities may be content to stay in more direct contributor positions rather than seeking management positions. We also cannot rule out the difficulties inherent in measuring broad abilities across a range of paid employment contexts. These and other speculations require further investigation. Nonetheless, the relationships between career level and alumnae abilities confirms a role for abilities in advancing to or effectively performing in higher level positions.

Conclusion

We have three questions for the transferability of the AACLC scheme: a) Does the scheme advance measurement and description of career achievement? (b) Can the scheme be transferred to other settings? c) What kinds of applications will the scheme support?

Existing measures of career advancement, the Socio-Economic Index or average annual salary paid to incumbents, are not particularly useful for describing career advancement in college outcomes studies, especially when position autonomy, responsibilities, or incumbent abilities are the desired underlying dimensions. Although the task of describing career advancement might be more thoroughly approached with a more comprehensive longitudinal study of career data beyond

job position titles, researchers are likely to find that objective longitudinal data on job position titles is easier to assemble than fielding a longitudinal study with a comprehensive set of questions that address the autonomy and responsibility of career positions.

The current version of the Alverno Alumnae Career Level Classification is only a draft of the desired scheme, even within the context of the study of Alverno alumnae. It will certainly need further development if other institutions are to apply it to the study of their alumni. Currently, the scheme only classifies all position titles that were reported by participants in the Alverno Longitudinal Study. Reliability of scoring can only be adequately addressed through cross-validation on new samples. Nonetheless, we found that the AACLC was at least internally consistent in the ranking of position titles of the alumna's colleagues in the organization. Furthermore, since only a small percentage of alumnae advance beyond college level positions five-years after graduation, the highest levels of the scheme (level 4 and 5) contain fewer examples than the lower levels.

The scheme is based, however, on relatively explicit principles that can be applied to include both more career areas and more examples of position titles in each career level. The scheme can be improved either by conducting further career development studies and/or by using existing descriptions of position-titles available in the professional literatures (e.g., US Department of Labor, 1991). One limitation of the AACLC scheme may prove difficult to address. For a range of liberal arts fields, the linkages to specific career field are difficult to specify. As we have noted, many liberal arts graduates pursue careers in education and business and management, and positions in these fields can be scaled in relation to expectations for college graduates.

Career fields are undergoing continual changes. Therefore, findings on rates of employment and career trajectories should also be interpreted in the context of existing conditions in the job market. Obviously, these issues are not unique to the AACLC. In fact, when we concern ourselves with individual market conditions, we are much more confident in tracking advancement through the AACLC than through changes in salary levels, which may involve local inflationary or deflationary pressures. We know that alumnae generally achieve positions with career levels commensurate with those they envision as students. In contrast, the student's achievement of a particular salary level is something to which the college may be less willing to hold itself accountable.

Career counselors and faculty may be able to use the relationship between career level and abilities demonstrated by incumbents to advise students on the importance of liberal learning to their careers. Because Alverno has an ability-based curriculum, we are particularly interested in the relationships between abilities and career achievement. The evidence that broad abilities such as Cooperative Organizational Thinking and Action are related to career achievement is not only a source of validation of the curriculum, but also a potential guide to further curriculum development (see Rogers et. al., 1994). Study of the determinants of patterns of career advancement or retrenchment may further illuminate ways in which faculty and career consultants can better understand and thus support career advancement of alumnae.

At the same time, the interpretation of any career achievement scoring scheme is complex and value laden, especially when applied to the careers of women. We do not make the assumption that career advancement or even working at *professional college-level* in paid employment are ultimate goals, or that certain career outcomes suggest failure for either the alumnae or the college. A career in paid employment is not necessarily a primary goal. One quarter of the alumnae made different choices for their primary goal. When evaluating college outcomes, we need to take into account the variety of the alumnae career goals and the way they prioritize them (see Mentkowski, 1983). While many women invested in both family and career, two thirds of the graduates with preschool children did not work full-time for the entire five years after graduation. At the same time, almost all of the alumnae had paid employment five years after college, and two thirds worked full-time continuously across the five years after their graduation. Although we have only studied the career advancement of women, such a specific understanding has a place in the ongoing struggle for women to define their leadership roles in society (cf. Astin & Leland, 1991).

How might other institutions benefit from the approach suggested in this paper? On the one hand, the findings described in this paper relate to a specific curriculum with specific assessment and learning principles (Alverno College Faculty, 1979, revised 1985, 1994) and a student population with specific characteristics. Even within the context of the determinants of the study of Alverno College career outcomes, they need to be cross-validated. Certainly, the findings do not answer all of our questions. On the other hand, the findings illustrate how using the scheme can facilitate research toward better understanding of the career advancement of college graduates. The AACLC approach involves using survey data and relatively low investment in code development and coding. We believe other institutions can use the strategy underlying the AACLC scheme for the purposes of informing their continuous improvement, as well as accountability. In linking institutional assessment to continuous improvement, our institution creates a process for meaningful feedback to faculty, staff and various publics about patterns of student and alumnae performance on a range of curriculum outcomes (see Mentkowski, 1994). In this career study, for example, this has entailed extended conversations toward shared judgments about expectations for positions. It also means our commitment to ongoing (as well as efficient) conversations with faculty and staff around emerging connections that arise within the college, as we share responsibility for developing a diverse community of research and practice.

The power of alumni studies is that they connect the institution to the careers and lives of its own graduates. Institutions can gain insight into how to improve their educational strategies when they have a better picture of the placement of their graduates and the challenges they are facing in their career and personal lives. Alumni studies can tell compelling stories about identifiable groups of students. We hope that by sharing our strategies, institutions of higher education can better understand and make the case for the impact of college learning on career achievement.

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